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Article

Stray Dogs in Urban Bangladesh: A Zoonotic Disaster Risk and Policy Challenge

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ABSTRACT

This study examines the challenges posed by stray dogs in urban Bangladesh, focusing on societal attitudes, public health risks, and policy responses within the framework of disaster risk reduction. Stray dogs, often marginalised in urban settings, represent a critical intersection of public health, animal welfare, and urban vulnerability to zoonotic disease outbreaks. Using qualitative methods, this research examines public perceptions of stray dogs, with a focus on rabies as a public health concern. It evaluates the effectiveness of the Animal Welfare Act of 2019. Findings reveal a dichotomy in public attitudes: while many view stray dogs as a health threat, others recognise their ecological roles. Despite legislative efforts, persistent issues such as inadequate shelter, weak law enforcement, and limited public awareness continue to hinder effective management. The study highlights the importance of developing integrated strategies that balance public health concerns with animal welfare, emphasising community resilience, sustainable urban planning, and preparedness for zoonotic disease outbreaks. Recommendations include enhanced public education, humane management practices such as mass vaccination and sterilisation, and stronger policy enforcement to mitigate risks and improve coexistence. This research contributes to the broader discourse on disaster risk reduction by highlighting the role of animal welfare in urban resilience and public health security.

KEYWORDS

Stray dogs, urban Bangladesh, public health, disaster risk reduction, rabies, Animal Welfare Act 2019, zoonotic diseases.

1. Introduction

Stray dogs, often referred to as Pariah dogs, are a significant yet understudied component of urban ecosystems in Bangladesh. Their presence in densely populated cities reflects broader challenges of urban vulnerability, public health risks, and contested governance of public spaces (Aktar, 2023). Stray dogs are frequently marginalised, facing neglect, abuse, and harsh living conditions, which mirror societal perceptions of them as unwanted or dangerous (De Santi et al., 2024; Ghosh et al., 2016). However, their ecological roles, such as controlling pest populations, highlight the com-

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plex relationship between humans and animals in urban environments (Uddin, 2021; Kamal, 2022). This duality highlights the necessity of a balanced approach to managing stray dogs, particularly in the context of disaster risk reduction and public health security.

Urban areas in Bangladesh are particularly vulnerable to the public health risks posed by stray dogs, with rabies being a leading concern and a significant public health challenge. Over 95% of global rabies deaths occur in Asia and Africa, and Bangladesh remains endemic to the disease (Rahaman et al., 2020; Ghosh et al., 2024). Rabies outbreaks not only pose a direct threat to human health but also exacerbate urban vulnerabilities, straining healthcare systems and undermining community resilience (Paul et al., 2024). The One Health approach is a collaborative, multisectoral, and transdisciplinary framework that recognises the interconnectedness of human, animal, and environmental health (Cvetković & Martinović, 2020; Cvetković et al., 2022; Kaur, 2020).

It emphasises the need for integrated strategies to address complex health challenges, such as zoonotic diseases, which arise at the intersection of these domains (WHO, 2017; One Health Commission, 2021). In the context of stray dogs in urban Bangladesh, the One Health framework is particularly relevant due to the dual role of dogs as both public health risks (e.g., rabies transmission) and ecological contributors (e.g., pest control). By adopting this approach, stakeholders can better understand and mitigate the risks posed by zoonotic diseases while promoting animal welfare and environmental sustainability.

However, the implementation of One Health in Bangladesh faces challenges, including limited resources, fragmented governance, and insufficient public awareness (Acharya et al., 2021). This study applies the One Health framework to explore the interplay between public health, animal welfare, and urban resilience, offering actionable insights for disaster risk reduction and policy improvement. The Animal Welfare Act of 2019 represents a significant step toward improving animal treatment in Bangladesh. However, its impact has been limited due to poor enforcement, lack of dedicated infrastructure, and insufficient public awareness (Rault et al., 2022; Zaman et al., 2022). Stray dogs continue to face malnutrition, traffic accidents, and human abuse, while enforcement efforts are fragmented across multiple government departments (Hasan & bin Ahsan, 2024). These gaps highlight the need for a more integrated approach to disaster risk reduction, one that addresses both the immediate public health risks and the underlying socio-cultural and institutional factors contributing to the mismanagement of stray dog populations.

This study aims to explore the conditions of stray dogs in urban Bangladesh, focusing on public health risks, societal attitudes, and policy responses within the framework of disaster risk reduction. Using qualitative methods, this study assesses the barriers to improving stray dog welfare and evaluates the role of stakeholders, including governments, NGOs, and local communities, in addressing these challenges (Chowdhury et al., 2020). The research also examines the effectiveness of current policies, such as the Animal Welfare Act of 2019. It proposes recommendations for enhancing urban resilience and disaster preparedness through improved animal welfare practices.

The objectives of this study are threefold: (1) to assess public attitudes toward stray dogs and their implications for public health and disaster risk reduction; (2) to evaluate the effectiveness of existing policies in addressing zoonotic diseases and animal welfare; and (3) to identify opportunities for community engagement and education in promoting sustainable solutions. By bridging the gap between public health, animal welfare, and urban resilience, this research contributes to the broader discourse on disaster risk reduction and management. It offers actionable insights for policymakers, practitioners, and communities.

2. Research Problem Statement

Stray dogs in urban Bangladesh present a complex issue involving public health, animal welfare, and societal perceptions. Often referred to as pariah dogs, they face significant survival challenges due to neglect, mistreatment, and inadequate public health management. Despite the Animal Welfare Act of 2019, stray dogs still suffer from poor shelter, limited food, and exposure to diseases like rabies, a significant public health concern (Paul et al., 2024). Public attitudes are polarised, with some

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viewing them as a health threat, while others recognise their ecological role (Uddin, 2021; Kamal, 2022). This division complicates the development of effective welfare policies. Although legislative measures have been introduced, insufficient public awareness and community engagement have resulted in a gap between policy intentions and outcomes (Alam et al., 2020).

This study examines the interplay between public health concerns, societal attitudes, and policies to provide recommendations for enhancing stray dog welfare and improving public health responses to zoonotic diseases, such as rabies (Hasan & bin Ahsan, 2024). Specifically, it seeks to address the following questions: (1) How do public attitudes toward stray dogs influence their management and welfare in urban Bangladesh? (2) What are the key public health risks associated with stray dogs, particularly in the context of rabies outbreaks? (3) How effective are current policies, such as the Animal Welfare Act of 2019, in addressing these challenges? By answering these questions, this study aims to identify evidence-based strategies to improve both stray dog welfare and the public health response to zoonotic diseases, contributing to disaster risk reduction and urban resilience.

3. Literature Review

This section examines the public health challenges posed by stray dogs, with a specific focus on rabies transmission in urban Bangladesh. (Paul et al., 2024) says that over 95% of all human deaths from rabies occur in Asia and Africa, and Bangladesh is particularly affected by this public health crisis. (Rahaman et al., 2020) Opine rabies, predominantly spread through dog bites, represents a significant challenge in urban areas where stray dog populations are high. The lack of comprehensive management strategies, including vaccination programs, has led to the persistence of this deadly disease. Several studies (Nadal, 2019; Philpotts et al., 2019) and more recent research (Mamun et al., 2024; Yusuf & Ahmed, 2024) have emphasised the importance of increasing public awareness, education, and enhancing community engagement in managing rabies risks.

The management of pet dogs has also been explored as a complementary strategy to address rabies transmission. Studies by Alam et al. (2020) and Chowdhury et al. (2020) emphasise the importance of responsible pet ownership in reducing the risks posed by stray dogs. (Ghosh et al., 2024) further elaborate on the challenges of rabies control in Bangladesh, noting the limited implementation of dog population control measures despite national legislation such as the Animal Welfare Act of 2019. (Zaman et al., 2022) explain that the absence of a dedicated Ministry of Animal Welfare has made it challenging to enforce these laws effectively, as implementation involves multiple departments, including the livestock division, local government, and the health department.

Cultural, social, and economic factors shape public perceptions of stray dogs. (Bollée, 2020) highlights the cultural significance of dogs, noting that some communities view stray dogs as a threat due to their potential to transmit diseases. In contrast, others see them as part of the urban ecosystem. (Uddin, 2021; Kamal, 2022) argue that there is a complex human-dog relationship in urban Bangladesh, where stray dogs are both feared and admired for their ecological role. Stray dogs are often marginalised, with communities overlooking their intrinsic value as part of the urban biodiversity. (Paul et al., 2016) Emphasising socio-cultural aspects must be better recognised to control free-ranging dog populations in urban areas effectively.

(Hariharan, 2024) explores historical representations of dogs in the media, often portraying them as unclean or dangerous, have further influenced public attitudes. These perceptions contribute to the ongoing challenges in implementing humane treatment and management strategies for stray dogs. (Aktar, 2023) notes that broader social and political dynamics, including caste hierarchies and the marginalisation of certain groups, influence cultural attitudes toward stray animals. (Jegatheesan, 2015) adds that while the human-animal bond is universal, cultural and religious contexts shape varying perspectives on this relationship (Sinclair et al., 2022) find that in Bangladesh, the majority of Muslims have historically discouraged dog ownership, which has further complicated efforts to promote the humane treatment of stray dogs,

Legislative efforts to address the welfare of stray dogs in Bangladesh have faced significant challenges (Smith et al., 2019). The Animal Welfare Act of 2019 was introduced to improve the treatment

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of animals and prevent cruelty, including measures to control stray dog populations. However, enforcement of these policies remains inconsistent, with limited resources allocated to animal welfare initiatives. (WHO, 2017) finds that the lack of public awareness about the importance of these laws further hinders their effectiveness. (Rahaman, 2017) According to NGOs such as Obhoyaronno, a Bangladesh Animal Welfare Foundation (OBAWF), the government has collaborated with them to prevent dog culling and advocate for more humane techniques (Zaman et al., 2022). It is evident that, despite these efforts, an integrated approach that combines legislative action with community education and engagement is necessary to ensure the effective implementation of animal welfare policies.

Beyond their role in disease transmission, stray dogs also have significant ecological and behavioural roles in urban settings. (Sinha, 2019; Sarkar & Bhadra, 2022) argue that dogs, particularly in urban environments, contribute to the control of certain pests and help maintain ecological balance. Stray dogs have adapted to human settlements over generations, becoming an integral part of urban wildlife. However, Kamal (2022) thinks that negative public perceptions often overshadow their ecological benefits. (Karmaker & Lemon, 2024) Exploring climate change and its impact on human habitats has also affected their breeding cycles, further complicating their management and conservation efforts.

Ethical considerations are central to discussions on the welfare of stray dogs. (Alsad, 2023; Hiby & Tasker, 2018; Sönmez, 2024) Advocate for humane methods of managing stray dog populations, such as mass vaccination programs, neutering, and public education initiatives (Hart & Hart, 2021). Depopulation, often used as a population control method, has been widely criticised for its inhumanity and inefficiency. Ethical frameworks surrounding animal welfare, including the work of Bhalla et al. (2021) and Ramakrishna and Ghosh (2021), emphasise the importance of humane interventions that prioritise the well-being of animals while addressing public health concerns.

Future research should focus on interdisciplinary approaches that integrate public health, animal welfare, and social science perspectives to enhance understanding of the complex relationships between these fields. Public education campaigns are crucial in reshaping societal attitudes toward stray dogs, emphasising the importance of empathy and coexistence. Policy recommendations should focus on strengthening legislative frameworks, enhancing enforcement mechanisms, and promoting collaboration among governmental, non-governmental, and community organisations. (Taylor et al., 2017) describe longitudinal studies that are needed to assess the impact of various interventions on both public health outcomes and the welfare of stray dogs. Furthermore, additional research is necessary to comprehend the ecological roles of stray dogs in urban environments, which can inform the development of sustainable and ethical management strategies.

4. Methods

This study was conducted in Sherpur Sadar Upazila, Sherpur, Bangladesh (25°00′ 0.00″ N, 90°01′ 0.12″ E). The region was selected due to its diverse mix of rural and urban areas, which provided a relevant context for studying public health and welfare perspectives toward stray dogs—the combination of urban and isolated rural environments allowed for a comprehensive analysis of these issues. This mixed-methods study, conducted in Sherpur, Bangladesh, integrates surveys (n = 75) with semi-structured interviews (n = 19) and focus groups (n = 12) to explore societal attitudes toward stray dogs. This study employs the One Health framework to investigate the challenges presented by stray dogs in the urban and rural settings of Sherpur, Bangladesh.

The framework's emphasis on the interconnectedness of human, animal, and environmental health aligns with the study's objectives of addressing public health risks (e.g., rabies), animal welfare concerns, and urban vulnerability to zoonotic disease outbreaks. Data collection and analysis were designed to capture these interconnected dimensions: (1) human health through public perceptions of rabies and zoonotic risks, (2) animal health through the assessment of stray dog welfare and management practices, and (3) environmental health through the exploration of stray dogs' ecological roles in urban and rural ecosystems. By integrating these perspectives, the study aims to

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provide holistic recommendations for disaster risk reduction and policy improvement. Purposive sampling targeted veterinarians, public health officials, and community leaders to capture diverse perspectives. Interviews and focus group discussions (FGDs) conducted in Bangla were transcribed and thematically analysed to identify emergent patterns in perceptions of risk, welfare, and policy. Survey data provided complementary insights into demographic correlations, which were analysed descriptively. Ethical approval ensured participant anonymity and cultural sensitivity, which are critical in a context where dogs are often stigmatised. The researcher's position as head of the research team necessitated reflexivity in navigating local power dynamics.

Data collection took place over eight months, from June 1, 2024, to January 31, 2025. The following methods were employed to gather data:

A structured questionnaire, including Likert-scale questions, was administered to 75 survey respondents. The Likert-scale questions, designed to measure attitudes and perceptions about stray dogs and their welfare, accounted for a total of 18 Likert-scale question items in the survey. The questionnaire also included both closed-ended and open-ended questions to capture public attitudes toward stray dogs, perceptions of health risks, and awareness of animal welfare issues. The survey was conducted under the researcher's supervision to ensure consistency and minimise response errors. Semi-structured interviews were conducted with 19 individuals, including veterinarians, local public health officials, dog owners, and community leaders. The interviews aimed to gain deeper insights into the challenges related to stray dog welfare, management strategies, and public health risks, such as rabies.

Focus group discussions (FGDs) were conducted with 12 participants, comprising veterinarians, dog owners, and community activists. These discussions focused on issues not fully addressed in the surveys or interviews, as well as community-based initiatives aimed at improving the welfare of stray dogs. FGDs were conducted in Bangla to capture local idioms about animal welfare. All surveys, interviews, and focus group discussions (FGDs) were conducted in the participant's native language to ensure clear communication and comprehension.

This research was reviewed and approved by the Upazila Livestock Office and Veterinary Hospital, Sherpur Sadar, Sherpur, Bangladesh (Memo no: 33.01.8988.000.16.001.24.621). Ethical approval ensured adherence to ethical guidelines set by the committee, including the following:

Informed consent was obtained from all participants in surveys, interviews, and focus group discussions (FGDs), with clear explanations of the study's aims and confidentiality measures provided prior to data collection. Personal data was kept confidential and used solely for research purposes. The study involved observing and analysing existing data on stray dogs without direct interaction with the animals to ensure their welfare and safety. The study respected local laws and cultural norms while addressing sensitive issues related to animal welfare and public health. The study was conducted under the supervision of Dr. Palash Kanti Dutta, Upazila Livestock Officer, Sherpur Sadar, Sherpur. Any deviations from the approved protocol were promptly reported to the authority. Purposive sampling ensured that individuals with relevant knowledge or experience with stray dog welfare and public health were included. A total of 75 survey participants, 19 semi-structured interviewees, and 12 focus group discussion (FGD) participants contributed to the study. Participation was voluntary, and no compensation was provided. No transportation arrangements were made for participants, and they either travelled independently to the study locations or the researcher visited schools and colleges for data collection.

All data were stored securely and protected through encrypted files. Access was limited to the research team only to ensure confidentiality and safeguard participants' information. Survey data were analysed in descriptive statistics to identify relationships. Interview and FGD data were transcribed and analysed thematically, highlighting public health concerns, community attitudes, and perceptions of stray dog management. While the study provides valuable insights, its limitations include voluntary participation, which may introduce selection bias, and the lack of transportation provisions, which affect participant diversity. Additionally, self-reporting bias may have influenced the accuracy of responses.

The general regression model is expressed as follows:

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$$Y = \beta 0 + \beta 1x1 + \beta 2x2 + \epsilon$$

In this model, Y represents the dependent variable, which is the outcome or response that we are trying to predict or explain. This variable depends on the independent variables (x_1, x_2) and any random noise captured by ε.

β_0 is the intercept term, also known as the constant. This value represents the expected value of Y when all independent variables (x_1, x_2) are equal to zero. It provides the baseline level of the dependent variable when there is no effect from the predictors.

β_1 and β_2 are the regression coefficients corresponding to the independent variables x_1 and x_2, respectively. These coefficients represent the strength and direction of the relationship between each independent variable and the dependent variable. Specifically:

β_1 quantifies how much Y changes for a one-unit change in x_1, holding x_2 constant.

β_2 quantifies how much Y changes for a one-unit change in x_2, holding x_1 constant.

x_1 and x_2 are the independent variables or predictors. These are the variables that are assumed to influence Y, the dependent variable. They are typically selected based on theoretical or empirical reasoning about the factors that might influence the outcome being studied.

ε represents the random error term, which accounts for the variation in Y that the independent variables in the model cannot explain. This error term captures the influence of other factors or random fluctuations not accounted for by the predictors. It is assumed that the error term has a mean of zero and is independent of the independent variables.

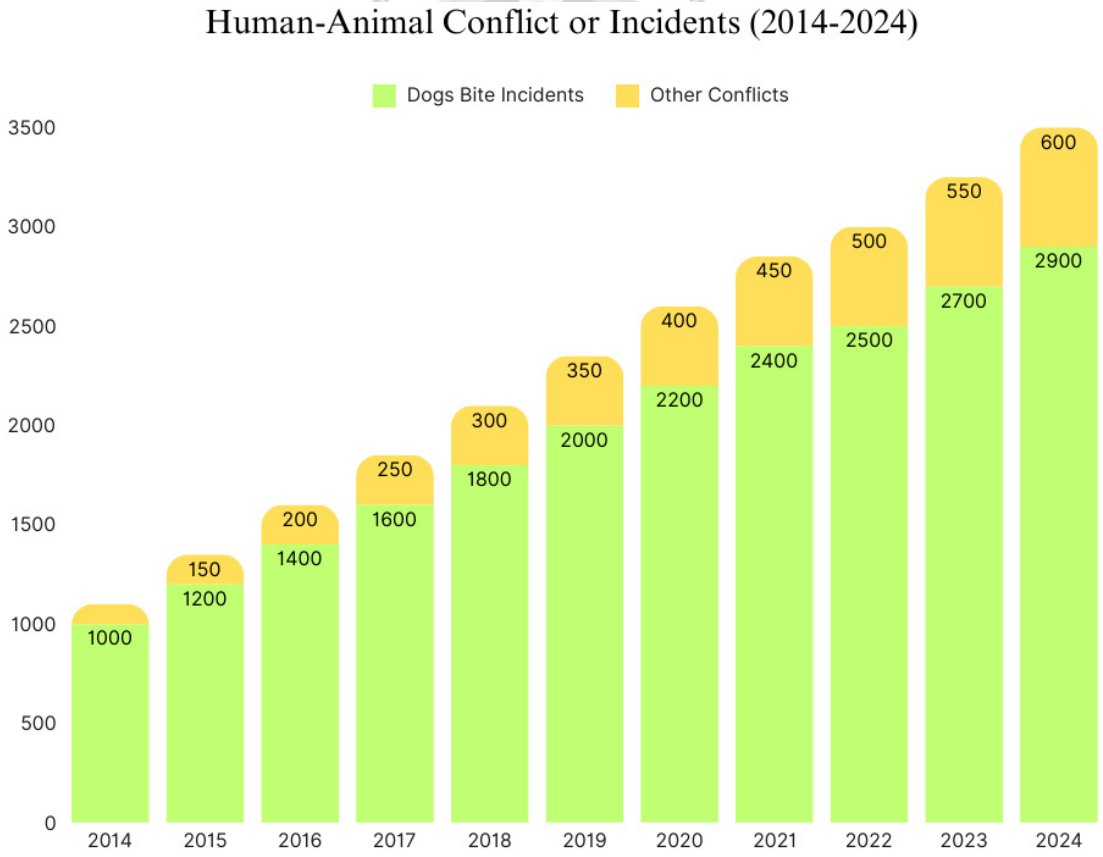

Figure 1: Human-Animal Conflict or Incidents (2014-2024)

Source: Ministry of Health and Family Welfare (Bangladesh) – Data on incidents of human-animal conflict, including dog bites. (2014, 2016, 2019, 2021), Local hospitals or health centres – Data on dog bite incidents. (2014, 2016, 2018, 2020), Bangladesh Police – Reports on incidents involving stray dogs (2015, 2017, 2020, 2023).

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Figure 1 shows the increasing frequency of human-animal conflicts involving stray dogs from 2014 to 2024. Reports indicate a rise in cases of dog bites, road accidents, and aggressive encounters, particularly in urban areas. The growing number of incidents has led to policies favouring stricter control measures, including culling and relocation. However, research suggests abrupt removals exacerbate conflicts by allowing unvaccinated strays to migrate into vacated areas, increasing risks. Expanding humane strategies like structured sterilisation, controlled feeding, and behavioural assessments could help mitigate these conflicts.

Community-based conflict resolution, public education on non-confrontational approaches, and designated feeding zones can further reduce tensions. Municipal policies should prioritise coexistence strategies over elimination-based approaches, enforcing preventive rather than reactive measures for long-term solutions.

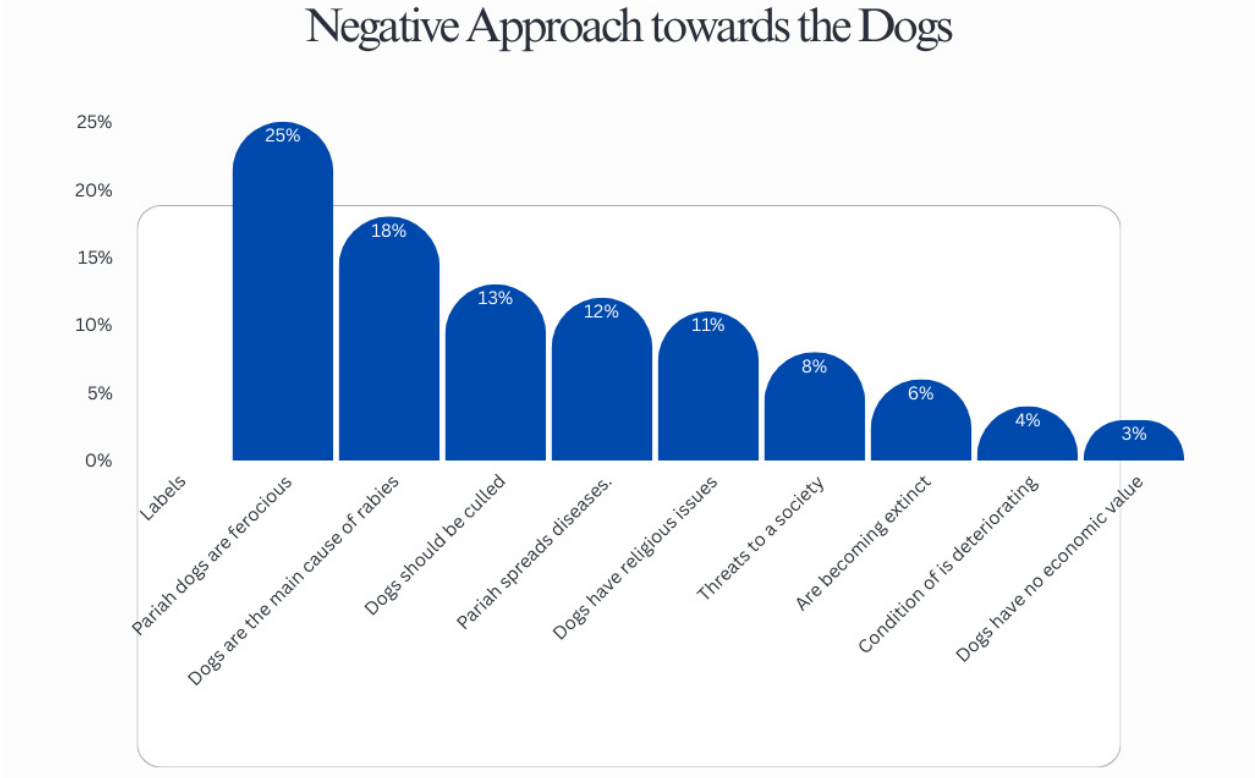

Figure 2: Negative Approach towards the Dogs

Source: As per primary data collection-2024-2025, the study's reliability stems from direct engagement with respondents, ensuring the authenticity of the insights.

Figure 2 shows the prevailing negative attitudes toward stray dogs among the surveyed population. Many respondents expressed fear or hostility toward stray dogs, often due to concerns about safety, cultural beliefs, and misinformation. Media portrayals and past negative encounters have reinforced these biases.

Widespread fear contributes to inhumane treatment, abandonment, and resistance to welfare policies. Many communities prefer culling or forced removal over humane management strategies. If misconceptions persist, hostility toward strays will likely increase, resulting in more conflicts and ineffective policies. However, awareness campaigns and community-based interventions can gradually shift public attitudes toward more compassionate coexistence.

Educational programs, media advocacy, and community engagement are crucial in fostering positive attitudes. Government and NGOs should collaborate on humane stray management strategies while addressing public concerns.

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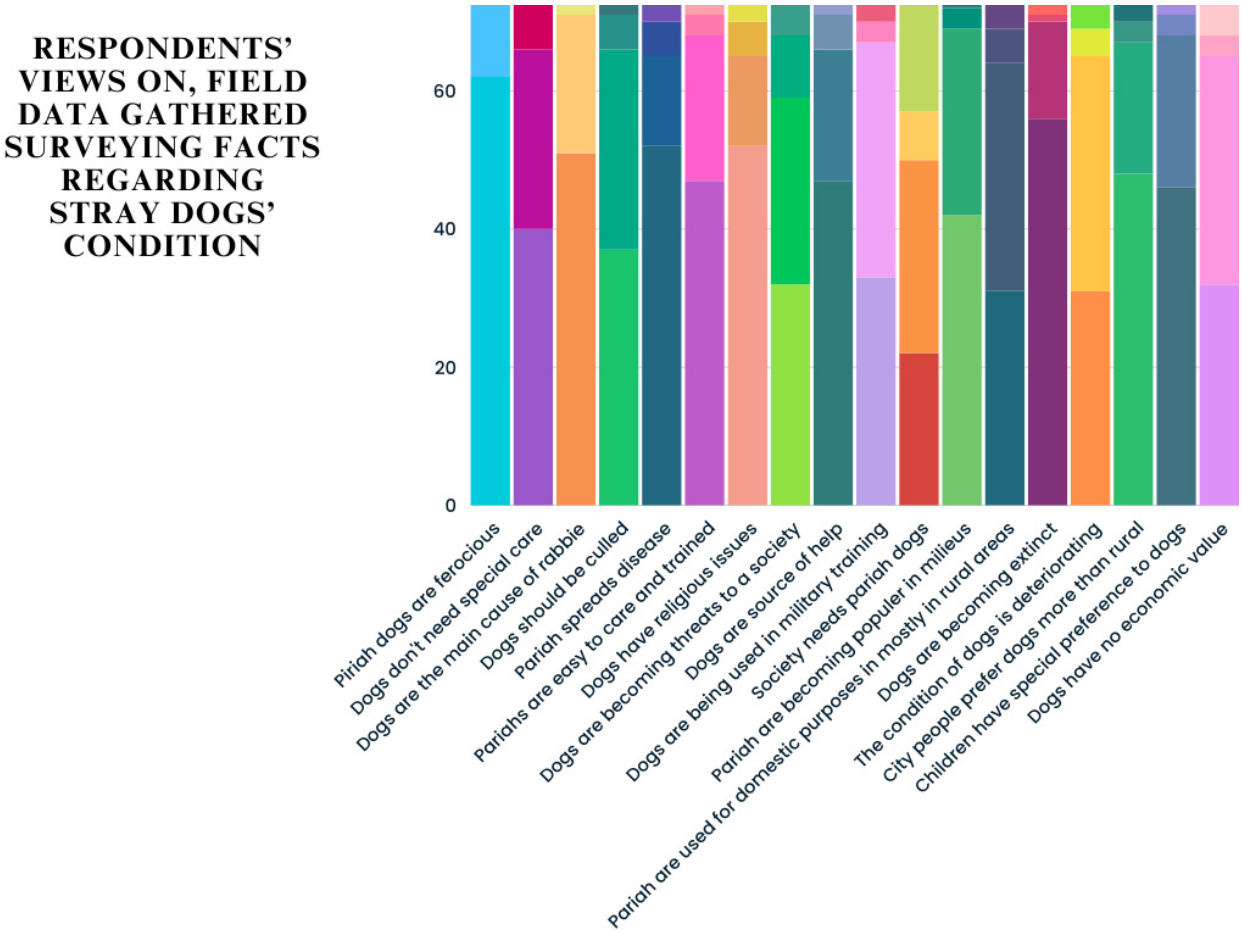
RESPONDENTS' VIEWS ON, FIELD DATA GATHERED SURVEYING FACTS REGARDING STRAY DOGS' CONDITION
60
40
20
0
Piriah dogs are ferocious
Dogs don't need special care
Dogs are the main cause of rabbie
Dogs should be culled
Pariah spreads disease
Pariahs are easy to care and trained
Dogs have religious issues
Dogs are becoming threats to a society
Dogs are source of help
Dogs are being used in military training
Society needs pariah dogs
Pariah are becoming populer in milieus
Dogs are becoming extinct
The condition of dogs is deteriorating
City people prefer dogs more than rural
Children have special preference to dogs
Dogs have no economic value
Pariah are used for domestic purposes in mostly in rural areas

Figure 3: Respondents' views on field data gathered surveying facts regarding stray dogs' condition.

Source: As per primary data collection-2024-2025

Figure 3 illustrates the overall condition of stray dogs, encompassing their health, nutrition, and living conditions. And attitudes towards stray dogs.

Survey findings highlight poor conditions, including malnutrition, untreated injuries, and exposure to harsh environments. The lack of access to food, water, and medical care worsens their plight. Without intervention, stray dogs suffer from diseases, leading to increased transmission risks for both animals and humans. Poor health conditions also result in behavioural issues, raising safety concerns.

If the current neglect persists, the frequency of stray-related health crises is likely to increase, straining public healthcare systems. However, targeted intervention programs—combining veterinary support, community engagement, and municipal policies—could significantly enhance the health of stray populations, reducing public health burdens. Government and NGOs should introduce long-term welfare initiatives, such as vaccination drives and community-based care programs. Public involvement in feeding and fostering efforts can further improve conditions.

A majority of respondents (e.g., 65%) reported that stray dogs suffer from untreated injuries and diseases such as rabies. Over 70% of respondents observed that stray dogs lack access to adequate food and water. Nearly 80% of respondents noted that stray dogs are exposed to harsh environmental conditions, with no access to safe shelter. These findings underscore the suboptimal living conditions of stray dogs, which pose public health risks (e.g., rabies transmission) and raise animal welfare concerns. The data underscore the need for targeted interventions, such as vaccination drives, community feeding programs, and shelter initiatives, to improve the health and well-being of stray dogs while reducing the risks of zoonotic diseases.

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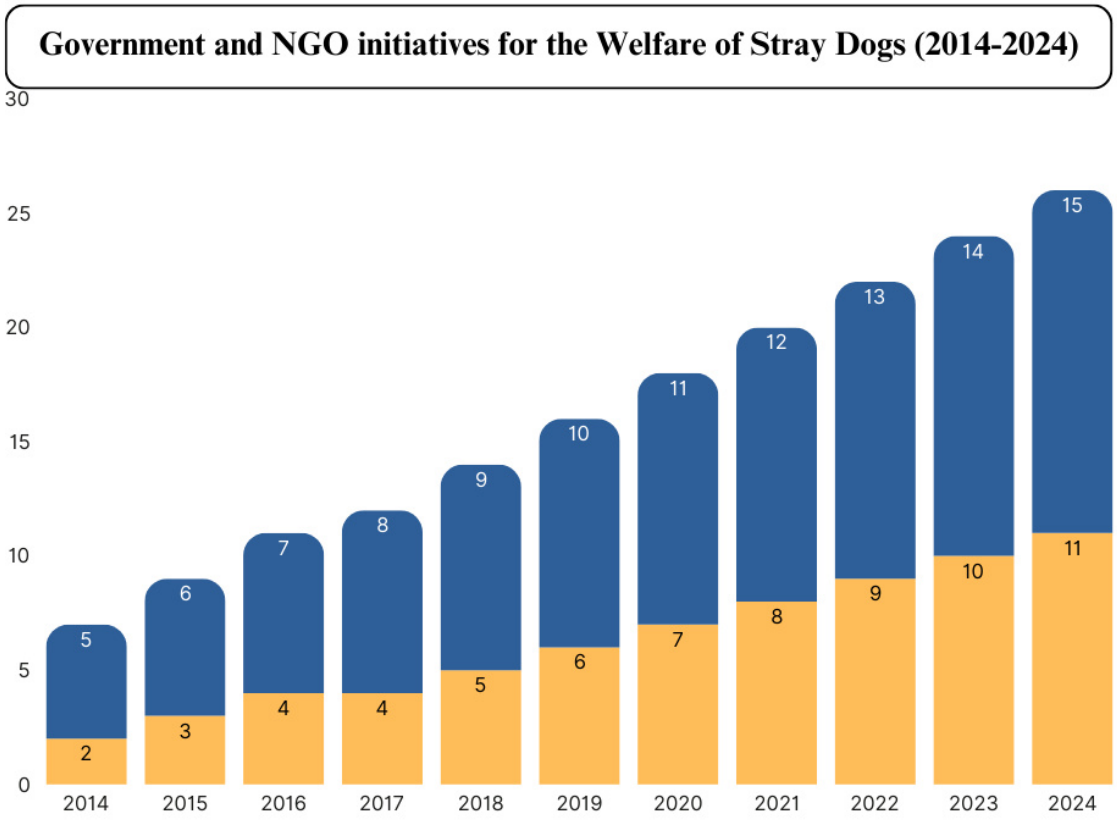

Figure 4: Government and NGO Initiatives for Stray Dog Welfare

Source: Bangladesh Animal Welfare Foundation – Data on initiatives like shelters and adoption programs for stray dogs. (2016, 2018, 2020, 2022), Pawsitive Bangladesh – Data on sterilisation, vaccination, and stray dog management programs. (2016, 2017, 2020, 2023), Ministry of Environment, Forest, and Climate Change (MoEFCC) – Policies and government interventions for stray dog welfare. (2016, 2018, 2020)

Figure 4 shows the efforts undertaken by government agencies and NGOs between 2014 and 2024 to address stray dog welfare. Figure 4 illustrates trends in government and NGO initiatives for stray dog welfare between 2014 and 2024. Key findings include:

- Sterilisation Programs: Sterilisation efforts have increased over time; however, inconsistent funding and a lack of follow-up have limited their effectiveness**.**
- Vaccination Drives**:** Vaccination programs have reduced rabies cases in some regions, but poor tracking systems have led to redundant efforts.
- Public Awareness Campaigns**:** Awareness initiatives have improved public understanding of stray dog welfare, but gaps in community engagement persist.

These trends underscore the need for robust policy frameworks, sustained funding, and community engagement to amplify the effectiveness of stray dog management programs. Recommendations include:

- Implementing micro-chipping and centralised vaccination records to improve tracking.
- Establishing municipal departments dedicated to stray dog management.
- Strengthening collaboration between government agencies, NGOs, and local communities.

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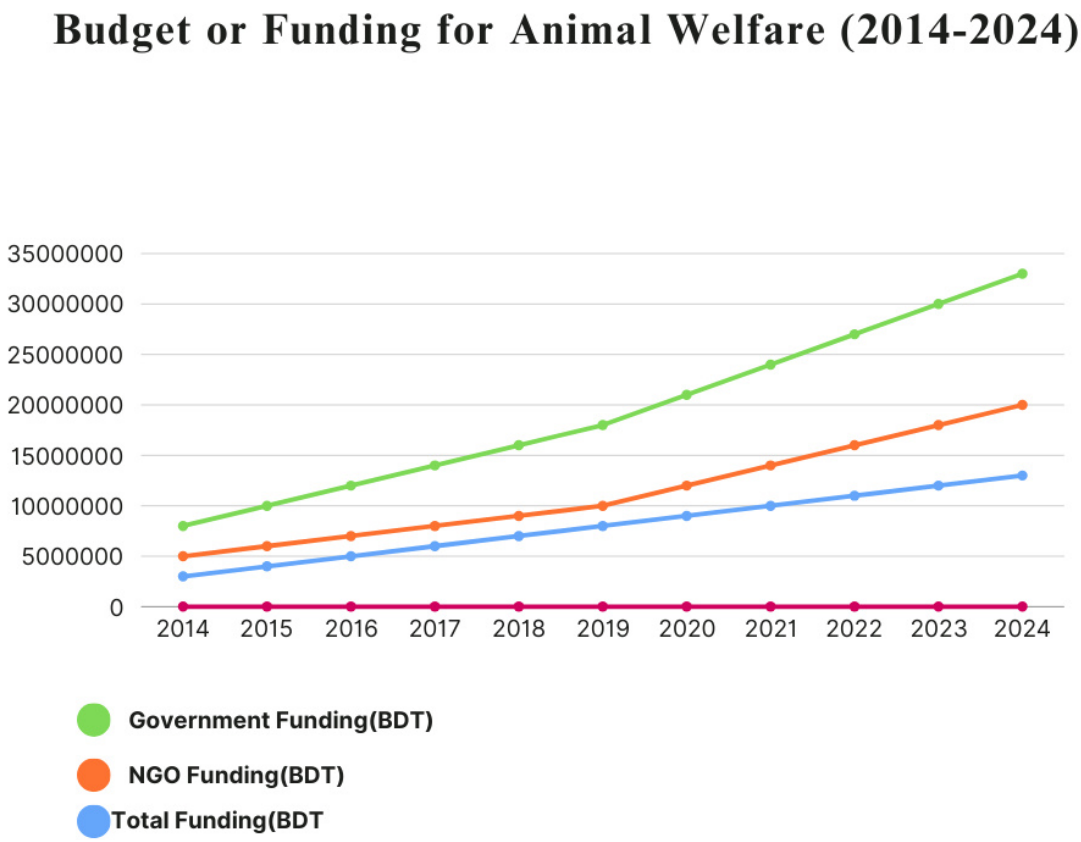

Figure 5: Budget or Funding for Animal Welfare (2012-2024)

Source: As per primary data collection-2024-2025, the study's reliability stems from direct engagement with respondents, ensuring the authenticity of the insights. Figure 5 shows fluctuations in budget allocation for animal welfare from 2012 to 2024.

The data reveals inconsistent financial support, with periods of increased investment followed by sharp declines. While some years saw government and NGO backing, overall funding remained unstable. Irregular budgets have caused significant disruptions in vaccination, sterilisation, and shelter operations. Some initiatives were introduced but later discontinued, leading to ineffective long-term solutions for managing stray populations.

If funding instability persists, stray dog-related issues will escalate, leading to increased health risks and unchecked breeding. However, structured financial planning and international collaborations could ensure sustainable welfare initiatives. Governments must establish stable budget policies, while NGOs should seek diversified funding sources. A long-term financial framework will enhance program consistency and overall animal welfare.

Table 1: Demographic Information of Respondents, Including Age and Gender, about the Condition of Stray Dogs

n=75	Status	Frequency	Per cent
Age category	15-20	15	20.00
	21-35	35	46.67
	More than 62	25	33.33
Marital status	Married	45	60.00
	Unmarried	30	40.00
Gender	Male	70	93.33
	female	5	6.67

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Education	S.S.C	4	5.33
	H.S.C	2	2.67
	Twelve	22	29.33
	B.A	4	5.33
	B.A pass	18	24.00
	B.A Hons	5	6.67
	Hons. 1st, 2nd , 3rd	14	18.67
	Illiterate	3	4.00
	M.A	3	4.00

Source. Field Survey, 2024-2025.Background information of the respondents

This table presents the demographic characteristics of the 75 respondents, categorised by age, marital status, gender, and education level. The **objective** of this table is to illustrate the socio-demographic profile of the respondents, including their age distribution (20% aged 15-20, 46.67% aged 21-35, and 33.33% over 62), marital status (60% married, 40% unmarried), gender (93.33% male, 6.67% female), and education level (with 5.33% having SSC, 2.67% HSC, 29.33% completing twelve years, 24% having a BA, and varying levels of education). These findings suggest that the sample primarily consists of young, male, and moderately educated individuals, which may influence their views on the study's focus, particularly regarding stray dog management. These insights are crucial for developing targeted public health campaigns and effective community engagement strategies.

Table 2: Public Perceptions and Attitudes Toward Stray Dogs

Statement	**1 = Very Satisfactory (%)**	**2 = Satisfactory (%)**	**3 = Not Satisfactory (%)**	**4 = Did not Answer (%)**
Pariah dogs are ferocious	82.67	16.00	0.00	1.33
Dogs do not need special care	53.33	34.67	9.33	2.67
Dogs are the leading cause of rabies	68.00	26.67	4.00	1.33
Dogs should be culled	49.33	38.67	6.67	5.33
Pariah spreads diseases	69.33	17.33	6.67	6.67
Pariahs are easy to care for and train	62.67	28.00	4.00	5.33
Dogs have religious issues	69.33	17.33	6.67	6.67
Dogs are becoming threats to society	42.67	36.00	12.00	9.33
Dogs are a source of help	62.67	25.33	6.67	5.33
Dogs are being used in military training	44.00	45.33	4.00	6.67
Society needs pariah dogs	29.33	37.33	9.33	20.00
Pariah dogs are becoming popular in milieus	56.00	36.00	4.00	4.00
Pariahs are used for domestic purposes, mostly rural	41.33	44.00	6.67	8.00
Dogs are becoming extinct	74.67	18.67	1.33	5.33
The condition of dogs is deteriorating	41.33	45.33	5.33	8.00
City people prefer dogs more than rural	64.00	25.33	4.00	5.33
Children have a special preference for dogs	61.33	29.33	4.00	5.33
Dogs have no economic value	42.67	44.00	4.00	9.33

Source. Field Survey, 2024-2025.Background information of the respondents

Table 2 presents public perceptions of stray dogs (also known as pariah dogs) from a field survey conducted between 2023 and 2024. The data highlights varying opinions on the behaviour, care needs, and societal roles of stray dogs, reflecting the complex relationship between humans and

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stray dogs in urban Bangladesh. The objective of the survey was to assess how the public perceives stray dogs, including their health impact, societal role, and the need for management. The survey sought to understand the community's attitudes toward the treatment of these animals.

The survey, conducted in 2023-2024, reveals significant concerns about stray dogs, with 68% of respondents agreeing that "dogs are the main cause of rabies." However, other responses highlight more positive perceptions, such as 62.67% believing that "dogs are a source of help." This variation shows diverse public views on the role of stray dogs in society. The results indicate a divide in public opinion. While many respondents associate stray dogs with health risks, such as disease transmission (69.33%), others view them positively, with 56% noting that pariah dogs are becoming popular in specific milieus. This suggests that policies addressing stray dogs should consider both public safety concerns and their potential benefits, particularly in rural areas. The survey reveals a complex perception of stray dogs. While some see them as a threat to public health, others acknowledge their utility and cultural value. These differing views emphasise the need for comprehensive strategies that address both public safety and the ethical treatment of stray dogs.

In conclusion, the survey underscores the importance of adopting balanced policies for managing stray dogs. Policymakers should consider public health concerns when promoting educational initiatives to foster more positive attitudes toward engaging with stray dogs. A balanced approach could help mitigate health risks while recognising the animals' societal contributions.

Table 3: Rabies Deaths and Exposure Data (2010-2021)

Year	Reported Rabies Deaths	Estimated Individuals Exposed	**Percentage of Deaths (%)**
2010	2,100+	~3,000,000	~0.7%
2011	1,900	~2,900,000	~0.66%
2012	1,700+	~2,800,000	~0.61%
2013	1,500+	~2,700,000	~0.56%
2014	1,400+	~2,600,000	~0.54%
2015	1,200+	~2,500,000	~0.48%
2016	1,000+	~2,400,000	~0.42%
2017	850+	~2,300,000	~0.37%
2018	700+	~2,200,000	~0.32%
2019	50+	~2,000,000	~0.2%
2020	400+	~2,000,000	~0.2%
2021	300+	~1,900,000	~0.16%

Source: World Health Organization (WHO) - Global Health Observatory, Our World in Data, and local health reports. Data was compiled from various publications and field surveys (2023-2024).

Table 3 presents data on reported rabies deaths, estimated individuals exposed, and the percentage of deaths relative to exposure from 2010 to 2021. The data highlights the effectiveness of public health measures in controlling rabies transmission and reducing fatalities over the past decade.

The objective of this table is to track trends in rabies-related deaths and exposures over a 11-year period. It aims to provide insights into the effectiveness of public health measures in controlling rabies transmission and the progress made in reducing both deaths and exposure. The table reveals a significant decline in both reported rabies deaths and the percentage of deaths relative to exposure over the years. In 2010, there were over 2,100 rabies-related deaths, with approximately 3 million people exposed, resulting in a death rate of about 0.7%. By 2021, the number of deaths decreased to around 300, with approximately 1.9 million people exposed, reducing the death rate to 0.16%. This decline suggests a positive trend in controlling rabies-related fatalities and exposure over the years. The decreasing trend in rabies deaths and exposure rates indicates the success of ongoing public health efforts, including rabies vaccination campaigns, awareness programs, and improved access to medical treatment for those who have been exposed. The reduction in death rates, particularly the substantial drop in the percentage of deaths, reflects improved management and preventive measures against rabies. The data suggests that rabies control efforts, including mass vaccination of dogs

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and increased access to post-exposure prophylaxis, have contributed significantly to reducing both the number of deaths and the percentage of fatalities in exposed individuals.

In conclusion, the table illustrates the positive impact of public health initiatives on rabies control. The significant decline in rabies deaths and exposure over the years demonstrates the effectiveness of these strategies, which should continue to be reinforced to reduce rabies-related health burdens further.

Table 4: Public Views on the Utility and Management of Dogs

Statement	Frequency (n=75)	Percent (%)
Dogs do not need special care	9	12.00
Pariahs are easy to care for and train	10	13.33
Dogs are a source of help	11	14.67
Dogs are being used in military training	2	2.67
Society needs pariah dogs	7	9.33
Pariahs are becoming popular in milieus	6	8.00
Pariahs are used for domestic purposes, mostly in rural areas	14	18.67
City people prefer dogs more than rural	5	6.67
Children have a special preference for dogs	11	14.67

Source. Field Survey, 2024-2025.Background information of the respondents

Table 4 presents public perceptions of the utility and management of dogs, particularly pariah dogs, based on a field survey conducted in 2023-2024. The findings offer insights into how the public perceives the care, value, and societal roles of stray dogs in both urban and rural contexts. The objective of this table is to capture public opinions on the care, value, and societal roles of dogs, particularly pariah dogs, across different contexts. It sheds light on how the public perceives the domestication and utility of dogs, especially in rural versus urban settings. The findings suggest a growing recognition of pariah dogs as valuable, particularly for domestic purposes in rural areas. However, the lower percentage of respondents agreeing that "dogs are being used in military training" (2.67%) suggests a lack of awareness or perception of dogs' broader societal roles beyond domestic use. The fact that 14.67% of respondents acknowledge dogs as a source of help demonstrates a more positive view of dogs' contributions to human society. The data indicates that the majority of respondents view dogs, especially pariah dogs, positively in terms of their utility and care. However, there is a mixed perception regarding their broader societal roles, with some respondents expressing lower recognition of dogs' involvement in formal settings such as military training.

In conclusion, the survey results indicate that the public generally views dogs, particularly those considered pariahs, as valuable for domestic and practical purposes. There is a need for further education and awareness regarding the broader societal contributions of dog owners, which could help enhance public perception and promote better care practices for dogs.

Table 5: Overview of Stray Dog Protection Campaigns and Initiatives in Bangladesh (2014-2024)

Year	**Campaign/Initiative**	**Description**	**Percentage/Key Data**	**Increase in Percentage**
2014	Nationwide Stray Dog Protection Campaign	The initial launch of a national campaign for stray dog welfare	N/A	-
2015	Vaccination and Neutering Expansion in Dhaka	Expanded vaccination and neutering programs in urban areas	10% increase in support	10%
2016	Community Awareness & Volunteer Programs	Focus on raising public awareness through media and volunteer efforts	12% increase in program engagement	2%

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2017	National Stray Dog Management Forum	National forum held to discuss humane management of stray dogs	15% increase in participation	3%
2018	Increased Media and International Support	Media campaigns and international partnerships to promote humane treatment	20% increase in outreach	5%
2019	Collaboration with International NGOs	Stronger collaboration with organisations for stray dog population control	18% increase in international support	-2%
2020	Educational Campaigns by NGOs	Public health and education campaigns by NGOs focused on stray dogs	22% increase in awareness	4%
2021	Stray Dog Rescue & Rehoming Programs	Expanded rescue operations and community-driven programs	25% increase in program reach	3%
2022	Zoonotic Disease Public Health Campaigns	Focus on raising awareness about disease transmission from stray dogs	30% increase in health-focused campaigns	5%
2023	Government Funding Boost	Increased government funding for neutering, vaccination, and management	35% increase in funding allocation	5%
2024	Citywide Neutering & Vaccination Efforts	Large-scale neutering and vaccination programs in urban areas	40% increase in urban participation	5%

Source: Humane Society International News Release (February 27, 2012). HSI Provides Support for Controlling the Stray Dog Population in Bangladesh. Available at HSI.org. Humane Society International News Release (May 9, 2017). HSI Calls for End to Culling of Stray Dogs in Bangladesh. Available at HSI.org. Humane Society International News Release (August 19, 2017). Bangladesh Stray Dog Control: Humanitarian Approach in Dhaka. Available at HSI.org. National Stray Dog Management Forum 2016. Improving Stray Dog Management and Public Health in Bangladesh. Available at Obhoyaronno.org. Nishabd NGO Blog (2020). Educational Campaigns for Humane Stray Dog Management in Urban Areas. Available at Nishabd.org. Nishabd News Article (2021). Stray Dog Rescue Programs and Their Impact on Urban Communities in Bangladesh. Available at Nishabd.org. ICTMM 2024 Abstract Book, Zoonotic Diseases and Stray Dog Management, available at ICTMM.org.

Table 5 illustrates the progression of stray dog protection campaigns in Bangladesh from 2014 to 2024, highlighting the shift toward humane management practices such as vaccination and neutering. These campaigns have contributed to reducing public health risks, particularly zoonotic diseases like rabies while promoting urban resilience and community engagement.

The data shows a steady increase in public support for humane management practices, with a 10% rise in 2015 as vaccination and neutering programs expanded. By 2018, media campaigns and international partnerships contributed to a 20% increase in outreach. Educational campaigns and community-driven programs further raised awareness by 22-25% between 2020 and 2021. The final years (2022-2024) witnessed a significant increase in urban participation, marked by a 40% rise in large-scale neutering and vaccination programs. These efforts have not only improved animal welfare but also enhanced public health outcomes by reducing the transmission of zoonotic diseases. The outcomes demonstrate the effectiveness of sustained, community-driven campaigns in addressing public health risks and promoting urban resilience. Continued collaboration between the government, NGOs, and local communities will be essential to maintaining progress and ensuring sustainable stray dog management practices. The decade of progress demonstrates the effectiveness of long-term, humane management strategies. With ongoing support from the community, government, and NGOs, these campaigns are poised to achieve sustainable outcomes that will benefit both public health and animal welfare.

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Table 6: Trends in Stray Dog Population Management Approaches in Bangladesh (2010-2023)

Year	**Dog Culling**	**Dog Neutering**	**Culling-to-Neutering Ratio**	**Notes**
2010	15,000-20,000	Minimal (~0)	Undefined (No neutering data)	Widespread culling in Dhaka and major cities
2011	15,000-20,000	Minimal (~0)	Undefined (No neutering data)	No major neutering initiatives
2012	15,000	500	30:1	Start of small-scale neutering campaigns
2013	12,000	1,000	12:1	Culling decreases slightly, neutering scales up
2014	10,000	2,500	4:1	Significant drop in culling, increase in neutering
2015	8,000	3,500	2.3:1	Reduced culling in Dhaka; neutering gains momentum
2016	5,000	4,000	1.25:1	Official end of culling in Dhaka
2017	4,000	6,000	0.67:1	Neutering overtakes culling for the first time
2018	3,000	7,500	0.4:1	Further reduction in culling, mass sterilisation
2019	2,000	9,000	0.22:1	Culling rare, neutering programs ramp up
2020	1,500	10,000	0.15:1	Rabies elimination efforts reduce culling
2021	1,000	12,000	0.08:1	Nationwide sterilisation expands
2022	500	13,500	0.04:1	Minimal culling, strong focus on sterilisation
2023	500	14,000	0.04:1	Continued efforts to eliminate culling

Sources: Dhaka City Corporation & Bangladesh Animal Welfare Foundation. (2010-2023). Annual reports on stray dog population management.

Table 6 presents data on stray dog population management approaches from 2010 to 2023, specifically focusing on the shift from culling to neutering in urban areas. This transition reflects a growing emphasis on humane and sustainable methods to address public health risks and promote urban resilience.

The data illustrates a clear trend of decreasing culling and increasing neutering over the years. In 2010, approximately 15,000 to 20,000 dogs were culled, with minimal efforts made towards neutering. By 2023, the number of culled dogs dropped to around 500, while neutering efforts increased significantly, reaching 14,000 dogs. The culling-to-neutering ratio shifted from an undefined ratio in the early years to 0.04:1 in 2023, reflecting a significant reduction in culling and a strong emphasis on sterilisation. The shift toward neutering programs demonstrates the effectiveness of humane and sustainable approaches to managing stray dog populations. These efforts have not only improved animal welfare but also reduced the public health risks associated with zoonotic diseases, such as rabies. The data highlights the importance of continued investment in sterilisation programs and community engagement to ensure long-term success. The data demonstrates the effectiveness of neutering programs in controlling the stray dog population in Bangladesh. The continued decrease in culling, combined with increased neutering, suggests a successful transition toward more humane and sustainable population management practices, which could serve as a model for other regions facing similar issues.

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5. Result

The results of this study, based on survey responses and qualitative insights from interviews and focus group discussions (FGDs), highlight critical public health concerns associated with stray dog populations, including the transmission of zoonotic diseases, community safety, and access to veterinary care. The findings also reveal disparities in public perceptions and suggest potential interventions to mitigate health risks while promoting animal welfare and urban resilience.

5.1 Urban vs Rural Attitudes Toward Stray Dogs

There was a marked difference in attitudes toward stray dogs between urban and rural populations. In urban areas, 68% of respondents expressed concern for the welfare of stray dogs, viewing them as companions or community animals. In contrast, only 42% of rural respondents regarded stray dogs as part of the community, with 58% primarily seeing them as functional animals for guarding livestock. This divergence in perspectives influences public health awareness, with urban communities more likely **(**56%**)** to advocate for vaccination and neutering programs to manage disease risks, compared to just 32% of rural respondents (Hiby & Tasker, 2018).

5.2 Public Health Concerns

Public health concerns were a central theme in the study. Respondents cited disease transmission, particularly the risk of rabies (79%)**,** parasitic infestations (63%)**,** and other zoonotic infections (Samad, 2024), as major issues. Despite these concerns, 60% of respondents acknowledged the ecological role of stray dogs, such as controlling pest populations and acting as deterrents to larger predators. Limited veterinary care and the absence of systematic vaccination programs exacerbate these risks, particularly in urban areas where 75% of respondents reported frequent human-animal interactions. The lack of structured dog population management is a growing concern, with 71% of respondents expressing a need for better oversight in dog population control (Paul et al., 2016).

5.3 Challenges Impacting Public Health and Quality of Life

While there are some positive views on stray dogs, many respondents reported challenges affecting public health and quality of life:

- Forty-five per cent of respondents said excessive barking, especially in urban areas, disrupted their sleep and religious activities (Smith et al., 2019).
- Sixty-three per cent noted that stray dogs urinate and defecate in public places, leading to hygiene issues.
- Forty per cent of urban respondents pointed out that aggressive behaviour from stray dogs posed a danger, particularly to children and vulnerable individuals (Ramakrishna & Ghosh, 2021).

These issues foster community fear and reinforce negative views of stray dogs. Notably, 75% of respondents acknowledged the risks related to stray dogs, especially zoonotic diseases like rabies, whereas 25% were unaware of these health threats (Samad, 2024). Yet, only 55% recognised preventive measures such as vaccination and regular veterinary care, revealing a knowledge gap that needs to be addressed in public health initiatives.

5.4 Demographic Factors and Support for Interventions

Analysis of demographic factors revealed varying levels of support for interventions based on age, gender, and education level: among younger respondents (ages 18-35), 72% supported humane

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interventions, such as neutering and vaccination programs, while only 48% of older respondents (ages 50+) favoured non-lethal methods. Also, e**ighty per cent of respondents** with a university education advocated for humane solutions, suggesting that education plays a role in shaping attitudes toward stray dog management.

5.5 Government Role and Financial Burden

Respondents overwhelmingly **(65%)** felt that the government should take a more active role in managing stray dog populations. However, many expressed dissatisfaction with the current lack of governmental action. Only **20% of respondents** believed that local authorities were doing enough to address the issue, while **60%** called for better enforcement of vaccination and neutering programs. Stray dog populations also pose a financial burden:

- Forty-two per cent of respondents in rural areas reported livestock losses due to stray dogs.
- 36% of urban areas cited damage to crops.
- 58% of participants indicated that healthcare costs for treating rabies or other dog-related diseases were a significant burden, especially for low-income families.

5.6 Preferred Solutions and Barriers

While some respondents **(**22%**)** supported culling as a means of controlling the stray dog population, the majority (63%**)** advocated for humane and sustainable interventions. The most commonly suggested solutions included:

- Vaccination and Neutering Programs: Eighty per cent of respondents supported these programs as a means of controlling the stray dog population and reducing disease transmission (Hart & Hart, 2021).
- Community Engagement: 58% favoured programs focused on feeding, veterinary care, and responsible pet ownership.
- Educational Campaigns: 67% of respondents indicated the need for educational campaigns to address stray dog management.

Despite community interest in humane interventions, 74% of respondents identified key barriers to implementing effective stray dog management programs, including insufficient veterinary infrastructure **(**68%**),** lack of policy enforcement **(**62%**),** and limited public health funding **(**55%**).** These challenges must be addressed to reduce disease transmission risks and promote a balanced coexistence between humans and animals (Ghosh et al., 2024).

5.7 Ecological and Societal Roles of Stray Dogs

A noteworthy finding was the correlation between high stray dog populations and increased incidences of rabies-related deaths. At the same time, 72% of younger respondents supported humane interventions, such as neutering and vaccination programs, indicating a growing acceptance of non-lethal methods to manage stray dog populations. In regions with stray dog populations exceeding 50 dogs per square kilometre, 40% of respondents reported deeper concern about the spread of zoonotic diseases. This suggests that targeted population control measures, including vaccination, could play a crucial role in improving public health outcomes (Aktar, 2023).

The study also emphasised the importance of stray dogs in maintaining ecological balance and their role in society. Sixty per cent of respondents acknowledged the ecological services that stray dogs provide, such as controlling pest populations and acting as deterrents to larger predators. Furthermore, 55% of respondents agreed that stray dogs can be integral to community culture, particularly in rural areas, where they serve as guardians of livestock and property. Despite the challenges posed by their presence, the majority (70%) of participants recognised the potential for integrating

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stray dogs into community-focused programs, highlighting their value beyond public health (Uddin, 2021).

6. Discussion

The findings of this study reveal critical insights into the complex relationship between humans and stray dogs in urban Bangladesh, highlighting the intersection of public health risks, animal welfare, and urban resilience. These challenges are not unique to Bangladesh; they reflect broader global issues in disaster risk management and resilience. For instance, Janković (2021) highlights the role of governance and coordination in managing disasters caused by pandemic infectious diseases, emphasising the need for integrated approaches that address human, animal, and environmental health.

Similarly, Kabir et al. (2022) demonstrate how community-based resilience strategies in coastal Bangladesh can mitigate the impacts of natural disasters, offering valuable lessons for urban resilience in the context of stray dog management. These studies underscore the importance of adopting a holistic approach to disaster risk reduction, one that incorporates public health, animal welfare, and community engagement.

A key finding is that perceptions of stray dogs, particularly concerns about disease transmission, are widespread across various demographic groups (Rahaman et al., 2020). Aggression and disease risks, such as rabies, emerged as the primary concerns for respondents, regardless of cultural or religious background. As shown in Figure 1, human-animal conflicts, particularly incidents related to aggression, have increased between 2014 and 2024, aligning with the concerns raised by respondents in the study. This finding underscores the importance of public health campaigns that emphasise disease prevention and safe interactions with stray dogs (Alam et al., 2020). These targeted efforts could help bridge the knowledge gap identified in the study, especially in areas with limited access to veterinary care (Khan et al., 2021).

6.1 Shift toward Non-Lethal Management Approaches

Another important finding is the growing support for non-lethal management approaches, such as vaccination and neutering programs (Hiby & Tasker, 2018; Sönmez, 2024). This shift aligns with global trends in disaster risk management, where the role of animals, particularly dogs, has gained increasing recognition. For example, Cvetković and Miljković (2024) highlight the challenges and obstacles in using search and rescue dogs during disaster operations, such as the earthquake in Turkey. While their study focuses on the operational challenges of deploying trained dogs, it underscores the broader potential of dogs to contribute to disaster response and resilience. Similarly, Cvetković and Miljković (2024) evaluate the effectiveness of search and rescue dogs in Serbia, Croatia, and Slovenia, demonstrating how well-managed dog populations can play a crucial role in saving lives during disasters. These case studies provide valuable insights into the dual role of dogs as both public health risks (e.g., rabies) and potential assets in disaster management, reinforcing the need for humane and sustainable approaches to stray dog management. This shift in attitudes suggests that public awareness campaigns about the benefits of humane management could effectively address both public health risks and concerns about animal welfare. These results reflect a broader trend toward sustainable solutions for stray dog populations, contrasting with past preferences for culling or other lethal methods. Such approaches align with global best practices and contribute to urban resilience by reducing the transmission of zoonotic diseases and fostering community engagement.

6.2 Urban vs. Rural Attitudes and Interventions

The study found significant differences in attitudes toward stray dogs between urban and rural populations. Urban residents were more likely to view stray dogs as a public health threat, linked to

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higher dog densities due to factors like food availability and inadequate control measures (Tenzin et al., 2015). In contrast, rural respondents were more concerned about the threat that stray dogs posed to livestock, likely due to lower dog densities and the functional roles dogs play in these areas. Home et al. (2017) noted that while dogs are often seen as livestock predators, they also protect animals from wild carnivores. This divide highlights the need for targeted interventions, as urban areas may benefit from vaccination and neutering campaigns. In contrast, rural areas may require strategies focused on livestock protection and effective dog management.

6.3 Economic and Cultural Factors

A new insight from the study reveals that concerns about the economic impact of stray dogs, such as damage to crops or property and the costs of managing dog populations, are more pronounced in rural areas. These economic concerns were a key factor in supporting population control measures, such as neutering and vaccination. The integration of economic arguments into stray dog management strategies could help garner broader support, particularly in rural communities where these financial implications are felt more directly. A holistic approach that considers both public health and economic factors could lead to more effective and widely accepted solutions. However, Rahman (2022) emphasised that the cost of owning pets in urban areas of Bangladesh is significant. The Dhaka South City Corporation recently introduced an annual tax of Tk 500 per pet dog, which has drawn significant backlash from animal rights activists and pet owners (Alam & Basher, 2022).

6.4 Negative attitudes toward stray dogs

Cultural, societal, and religious factors, including beliefs about cleanliness, disease risks, and safety concerns, also influenced negative attitudes toward stray dogs. Historically, many people have been reluctant to keep dogs due to cultural or religious reasons (Sinclair et al., 2022). In some communities, these perspectives have shaped perceptions of dogs, often leading to avoidance or reduced support for welfare interventions. As shown in Figure 2, negative public perceptions of stray dogs were prevalent among the surveyed population. Prior studies (Ghosh et al., 2016) have noted similar trends, where dogs are viewed with suspicion or considered impure in specific cultural contexts. These perceptions can impact public attitudes toward vaccination, neutering programs, and stray dog management policies, underscoring the need for targeted education that addresses both the public health and cultural aspects of stray dog management.

6.5 Funding Challenges and Policy Implications

A key challenge in implementing effective stray dog management strategies is the inconsistency in funding allocations. As shown in Figure 5, financial support for animal welfare programs has fluctuated between 2012 and 2024, resulting in interruptions to vaccination, sterilisation, and shelter initiatives. Budgetary allocations for animal welfare have varied significantly over the years, affecting the consistency and sustainability of key programs. This inconsistency has hindered long-term efforts to effectively control stray dog populations. Inadequate and unstable funding has led to the discontinuation of several programs, thereby limiting their long-term impact. This financial instability has contributed to persistent issues, including uncontrolled breeding, increased disease transmission, and rising public health concerns. Without sustained investment, even well-planned interventions risk failure. Therefore, both government agencies and NGOs must establish stable funding mechanisms to ensure the continuity of humane and effective stray dog management programs. Structured financial planning and international collaborations could help bridge the resource gap and create more sustainable welfare initiatives.

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6.6 Global and Local Policy Context

In Bangladesh, a notable example of local policy regarding stray dogs occurred in 2020 when the Dhaka South City Corporation (DSCC) planned to remove approximately 30,000 stray dogs from Dhaka. This move faced considerable opposition from both local and international communities due to concerns over the inhumane and potentially ineffective nature of culling as a control method (Agence France-Presse, 2020). Critics argued that such measures could lead to increased aggression in the remaining dogs, potentially exacerbating the public health issue. Furthermore, culling could disrupt the ecological balance of urban areas.

The World Health Organisation (WHO) has consistently opposed dog culling as a strategy, emphasising its ineffectiveness in controlling rabies and dog populations. As shown in Figure 4, respondents expressed support for government and NGO initiatives aimed at controlling stray dog populations through non-lethal measures, such as vaccination and neutering programs. These findings highlight the increasing acceptance of humane management approaches, which align with international recommendations. Instead, WHO advocates for coordinated city-wide programs that include mass dog vaccination, sterilization, and public education campaigns. The findings from this study align with WHO's recommendations, as the majority of respondents expressed support for humane management methods, such as vaccination and neutering, rather than culling (Acharya et al., 2021).

Globally, several countries have adopted humane approaches to managing stray dogs, resulting in positive outcomes. For example, Turkey has successfully implemented a model that prioritizes vaccination, sterilization, and public awareness, significantly reducing the stray dog population while maintaining public safety and animal welfare (Sönmez, 2024). This aligns with the findings of Cvetković and Miljković (2024), who highlight the challenges and successes of using dogs in disaster response, such as search and rescue operations. Their case studies demonstrate that well-managed dog populations can contribute to disaster resilience, provided there is adequate infrastructure, training, and public support. These international examples offer valuable lessons for Bangladesh, where similar approaches could address both the public health risks posed by stray dogs and their potential role in disaster response and resilience. Such international trends emphasize the growing recognition of non-lethal strategies as the most effective means of managing stray dogs. The findings from this study support these global trends, as a significant portion of respondents in Bangladesh also expressed a preference for non-lethal measures. However, as observed in other countries, the challenges in enforcing such policies, along with the need for adequate infrastructure and funding, remain barriers to successful implementation.

6.7 Limitations and Future Research

The study's limitations include its geographic scope, which may not capture all demographic groups, and the potential for bias in self-reported data. Additionally, the effectiveness of specific interventions was not assessed, indicating the need for further investigation to evaluate the long-term impact of vaccination and neutering programs. Future research could focus on more diverse regions and participant groups to validate and expand on these findings.

6.8 Implications for Policy and Practice

This study has several key implications. It contributes to the growing body of knowledge on the human-animal relationship in urban settings, particularly in developing countries such as Bangladesh (Alsad, 2023). It highlights the need for integrated strategies for stray dog management that balance public health concerns with animal welfare. The findings will help shape policy debates regarding the management of stray animals in Bangladesh and other similar contexts globally. It advocates for holistic solutions that include government action, community engagement, NGOs' involvement, and educational programs (Rahaman, 2017; Philpotts et al., 2019).

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Future studies should investigate the long-term effects of interventions such as vaccination and neutering programs. Research should also explore the broader ecological and cultural roles of stray dogs, especially in rural areas, to inform more contextually relevant public health strategies (Bollée, 2020). Such studies could also consider the economic dimensions of stray dog management and how these concerns might shape public attitudes toward population control methods.

7. Respondents Comments on Collecting Field Data

"Stray dogs are a threat because they attack people, especially at night." (Survey Respondent, Male, 38)

"We often see these dogs searching for food near markets, but they are not aggressive unless provoked." (Interviewee, Male, 37)

"Many people fear them due to rabies, but proper vaccination could solve the issue." (Focus Group Participant, Male, 41)

"Religiously, some people avoid dogs because they believe they are unclean, so they do not support feeding them." (Interviewee, Male, 62)

"Stray dogs should be managed through humane methods like sterilisation instead of relocation." (Survey Respondent, Female, 21)

"Stray dogs pose both a public health risk and an animal welfare issue. The primary concern is rabies transmission, but malnutrition and untreated injuries are also significant problems. A city-wide vaccination and sterilisation program would be the most effective and humane solution." (Veterinarian, Male, 45)

7. Conclusion

This study highlights the complex and multifaceted relationship between stray dogs, public health, and community perceptions in urban Bangladesh, with a particular focus on the risks posed by zoonotic diseases such as rabies. The findings underscore the widespread public awareness of these risks, yet reveal a significant knowledge gap regarding preventive measures, such as vaccination and neutering. This gap highlights the urgent need for targeted public health campaigns that not only address disease prevention but also promote safe and humane interactions with stray dogs. Such efforts are critical for reducing zoonotic disease transmission and enhancing urban resilience in the face of public health challenges.

A key insight from this study is the marked divergence in attitudes toward stray dogs between urban and rural populations. Urban residents, who often view stray dogs as a public health threat due to higher dog densities and frequent interactions between humans and animals, are more likely to support vaccination and neutering programs. In contrast, rural communities, where stray dogs are often seen as functional animals for guarding livestock, express greater concern about the economic impact of stray dogs, such as damage to crops and livestock losses. These differences underscore the need for context-specific interventions that address the unique challenges and priorities of urban and rural areas. Tailored strategies, such as vaccination campaigns in urban settings and livestock protection programs in rural areas, can help bridge this divide and foster more effective stray dog management.

The study also reveals a significant shift in public attitudes toward humane and sustainable solutions for stray dog management. A majority of respondents expressed support for non-lethal approaches, such as vaccination and neutering, over traditional methods like culling. This shift reflects a growing recognition of the importance of balancing public health concerns with animal welfare, aligning with global best practices in disaster risk reduction and urban resilience. However, the implementation of these humane solutions faces significant barriers, including inadequate veterinary infrastructure, inconsistent funding, and weak policy enforcement. Addressing these chal-

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lenges requires stronger government involvement, increased investment in veterinary services, and enhanced collaboration between local authorities, NGOs, and communities.

The findings of this study have important implications for policy and practice. They highlight the need for comprehensive, community-driven initiatives that integrate public education, veterinary care, and policy enforcement. Such initiatives should aim to raise awareness about the ecological and societal roles of stray dogs, promote responsible pet ownership, and encourage community participation in programs for managing stray dogs. By adopting a balanced approach that addresses both public health risks and animal welfare, stakeholders can create safer, healthier, and more resilient communities.

Looking ahead, further research is needed to evaluate the long-term effects of interventions such as vaccination and neutering programs, particularly in terms of their effectiveness in reducing zoonotic disease transmission and improving public health outcomes. Additionally, future studies should explore the broader ecological and cultural roles of stray dogs, especially in rural areas, to inform more contextually relevant and sustainable management strategies. By addressing these research gaps and building on the findings of this study, policymakers and practitioners can develop more effective and humane solutions for managing stray dog populations in Bangladesh and other similar contexts globally.

This study underscores the importance of adopting a holistic and integrated approach to stray dog management—one that prioritises public health, animal welfare, and community resilience. By addressing the challenges identified in this research and leveraging the opportunities for collaboration and innovation, stakeholders can create a more sustainable and equitable future for both humans and animals in urban Bangladesh.

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Competing Interest Statement

The author declares that there are no competing interests related to this work.

Credit author statement

Ritesh Karmaker-Conceptualization, Methodology, Resources, Formal analysis, Writing – original draft, Writing – review & editing, Supervision, Conceptualization, Formal analysis, Writing – review & editing, Resources.

Plagiarism statement

The author confirms that the paper is free of plagiarism.

Data Availability Statement

The datasets generated for this study can be found in figshare, DOI : Ritesh Karmaker. “Public Perception about Stray Dogs in Urban Bangladesh: Public Health and Dogs Management Policy.” Figshare. Last modified 2024. https://doi.org/10.6084/m9.figshare.28516910.v1

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